IMPROVING THE LEAD DUST FINAL CLEAN PROTOCOL TO REDUCE COCKROACH ALLERGEN EXPOSURE

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Overview and Purpose

Lead poisoning and asthma are the two most serious environmental health concerns for children when considered in terms of the number of children effected, the nature of the impairments, the immediacy of the impact, the strength of the evidence, and the disproportionate prevalence among poor and minority children. Both are significantly related to residential environmental exposures in substandard housing. Control of residential hazards associated with lead poisoning and asthma - lead-contaminated dust and soil and asthma allergens and irritants - is particularly difficult. It is not surprising that researchers are finding an overlap in households with lead poisoned children and children with asthma. This, overlap allows development of cost-effective multi-hazard strategies to address both conditions.

For both lead poisoning and asthma, removal of contamination from household surfaces is a necessary part of any remediation strategy. Over the last several years, through HUD's Lead Guidelines and its lead hazard control grant program, considerable progress has been made in establishing an effective protocol for cleanup of lead-contaminated household dust. This project will evaluate the extent to which the HUD Lead Guidelines' protocol for final lead dust cleanup, and probably modifications of that protocol, can be effective in reducing household contamination by cockroach allergen, a potent trigger for asthma sensitization and exacerbation.

The usual method for assessment of cockroach allergen contamination is a monoclonal analysis of vacuum dust samples. Recent research indicates that the exposure threshold for sensitization to cockroach allergen is near the detection limit of the standard monoclonal assay. Researchers in the Department of Entomology, University of Florida, who are collaborating on this project have developed a polyclonal detection assay for roach allergens that is more sensitive and less costly than the standard monoclonal detection assay. This lower cost allows many samples to be taken within a housing unit and the use of these to estimate the spatial distribution of the antigen load. This spatial analysis can improve the effectiveness of the cleanup and lower the cost (by reducing clearance failures) by providing precision targeting of cockroach allergen "hot spots."

Participating Organizations

Overall management of the project will be through the Project Steering Committee, made up of staff from each of the partner organizations. Environmental Health Watch will provide overall administration, day-to-day management and staffing for environmental sampling and data management. The Cuyahoga County Metropolitan Housing Authority will be responsible for selecting and enrolling the housing units, inspection, daily relocation of occupants and management of the integrated pest management and specialized cleaning contractors.

The USDA Agricultural Research Service, Gainesville, Florida, is responsible for the research design and protocols, training of field staff, polyclonal detection assays and data analysis. The Greater Cleveland Asthma Coalition provides overall guidance for the project and is the link to community health and housing organizations that -all make use of its findings.

Prior Residential Hazard Work Experience

Environmental Health Watch has experience in conducting lead hazard control work, researching the effectiveness of lead hazard control interventions, developing multi-hazard assessment procedures and intervention strategies. Cuyahoga Metropolitan Housing Authority has managed numerous asbestos abatement, lead hazard control and mold remediation projects in its housing. The USDA ARS has developed the polyclonal detection assay for cockroach antigen and has pioneered reduced risk cockroach management. The Asthma Coalition is developing an asthma intervention project that combines optimization of medical treatment, patient education and environmental interventions for remediation of asthma triggers.

Target Area Characteristics

The target area for this project is scattered site family housing with current cockroach infestation owned by the Cuyahoga Metropolitan Housing Authority. The average income of residents living in family housing is $6,873; 100% are low-income and nearly all are below very low-income. Ninety-five percent of residents under 65 are Medicaid eligible. Eighteen percent of the residents, 1750, are under six years old. Ninety-two percent of the population is African-American.

Project Scope and Implementation

This project will intensively evaluate the effectiveness of interventions directed at three of the most common and serious residential hazards for children living in low-income housing - lead dust, cockroach allergen and household pesticide residue. We will recruit 15 separate households living in scattered site units of the Cuyahoga Metropolitan Housing Authority. After confirmation of cockroach infestation and then cockroach elimination by integrated pest management methods, a HUD standard final lead cleanup will be progressively modified. Modifications will be based on evaluation of the cleaning effectiveness in roach antigen reduction by pre- and post-cleanup testing using polyclonal and monoclonal detection methods. The goal is to consistently reach reduction of roach antigen to below reported sensitization levels. A second test to assess recontamination, will be carried out one month later.

Projected Impact

An effective and low cost roach antigen assessment and cleanup, based on the HUD lead final clean protocol, would be of very great value to housing and health organizations in the Cleveland area and to similar programs elsewhere. Most immediately, the Public Housing Authority residents will benefit as it incorporates the new cleanup procedures into its response protocol for residents with asthma. in addition, the Cleveland Department of Public Health, the Cuyahoga County Board of Health, the Cleveland Housing Network and other housing and health organizations participating in the Asthma Coalition, are committed to integrating effective roach antigen assessment and cleanup methods into their current housing activities.